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GB 1401529 GB 0975271  
GB 1166894 GB 0813265  
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Selected US specifications from IPC sub-class F16B

(54) Suction device for attaching  
articles to a surface

(57) A device for fixing small household electrical appliances, tools and various other articles on a working surface (1) comprises a cup member (3) with an edge (3A) suitable for acting on the periphery of a sucker (5). An axial tension rod (9) is attached centrally to the sucker (5) by means of disc-like projections (7), and is axially guided in the cup member (3), the rod (9) being arranged to be retracted axially with respect to the cup (3) in order to activate the sucker. The rod (9) is moved axially by rotating a manoeuvring member (10) which has a pair of helical cam surfaces cooperating with a diametral pin (18) secured to the upper end of the rod (9).

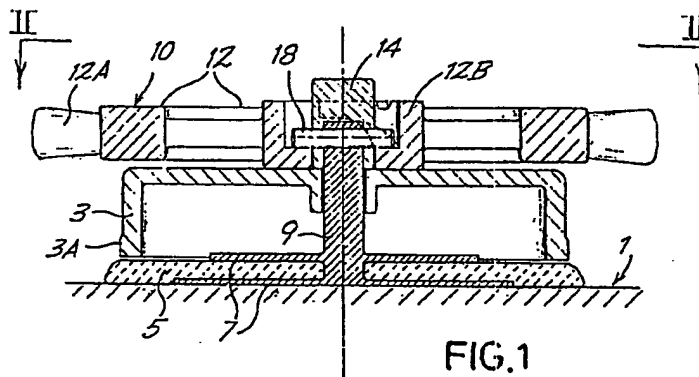
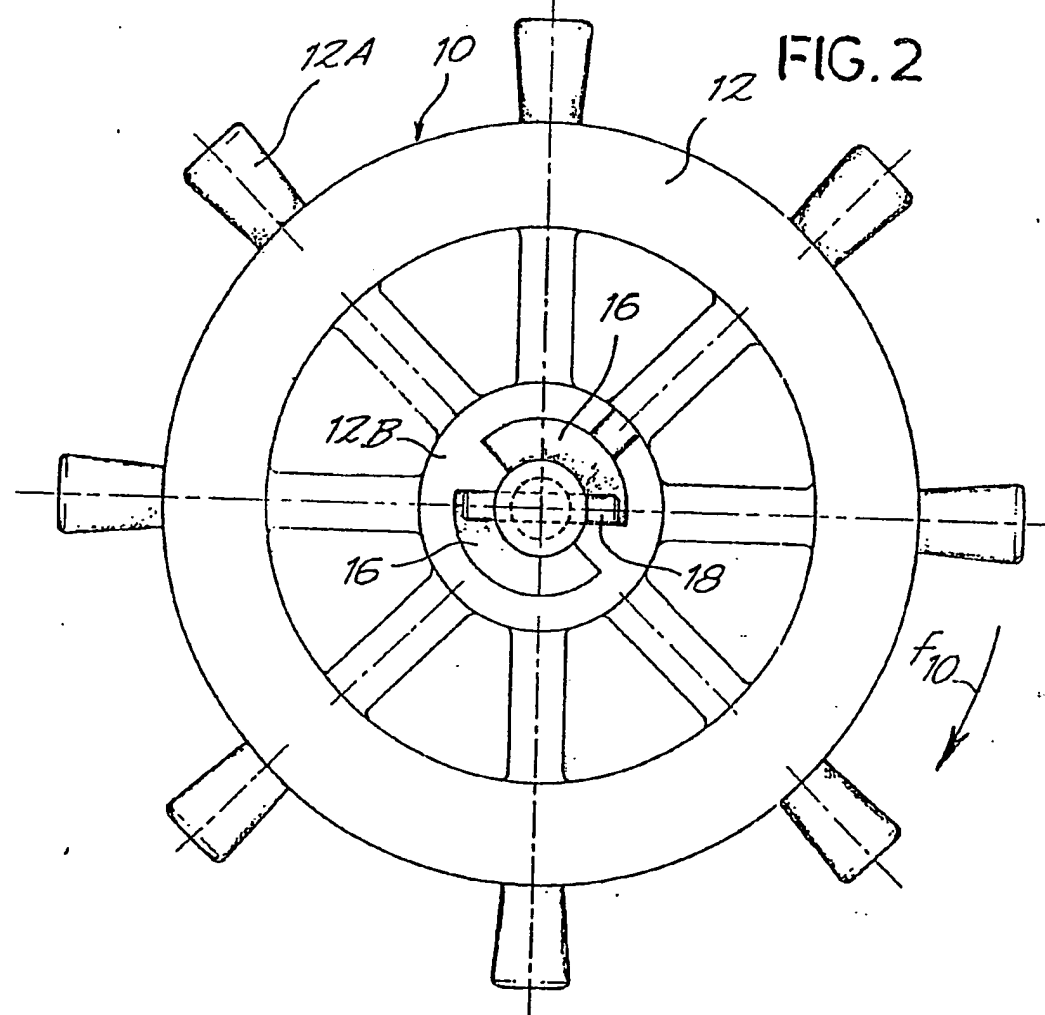
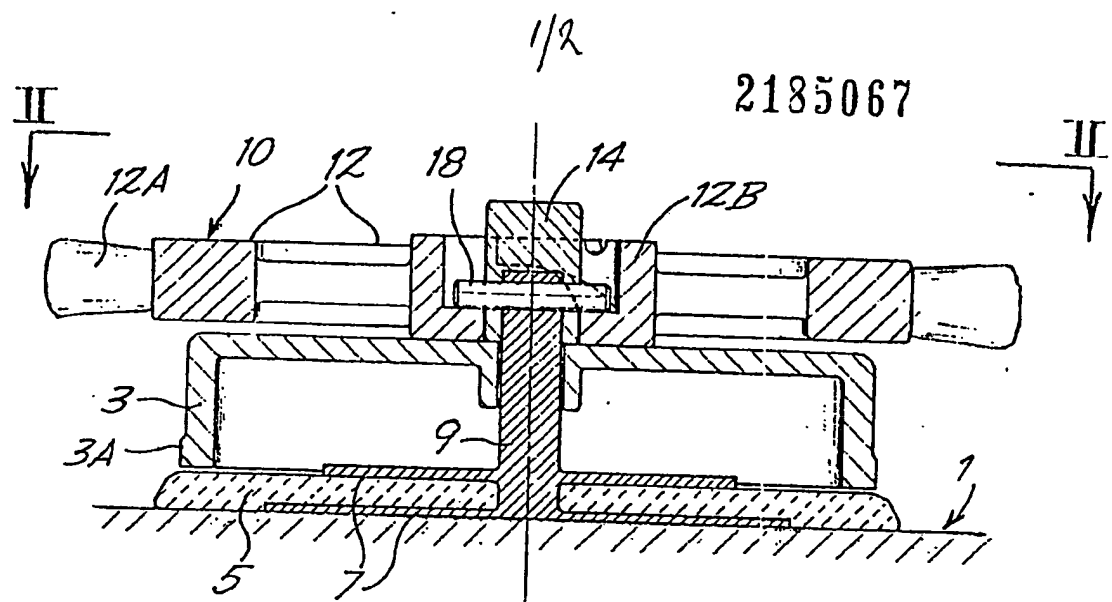


FIG.1

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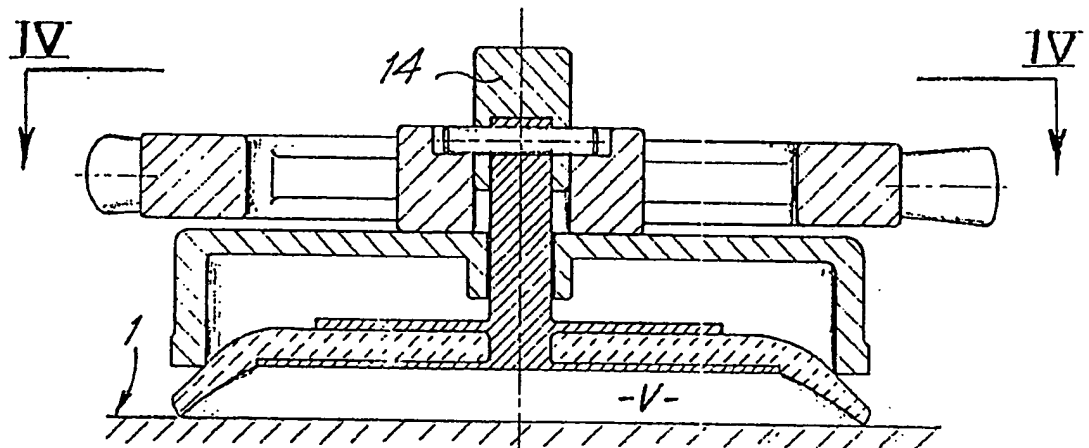


FIG. 3

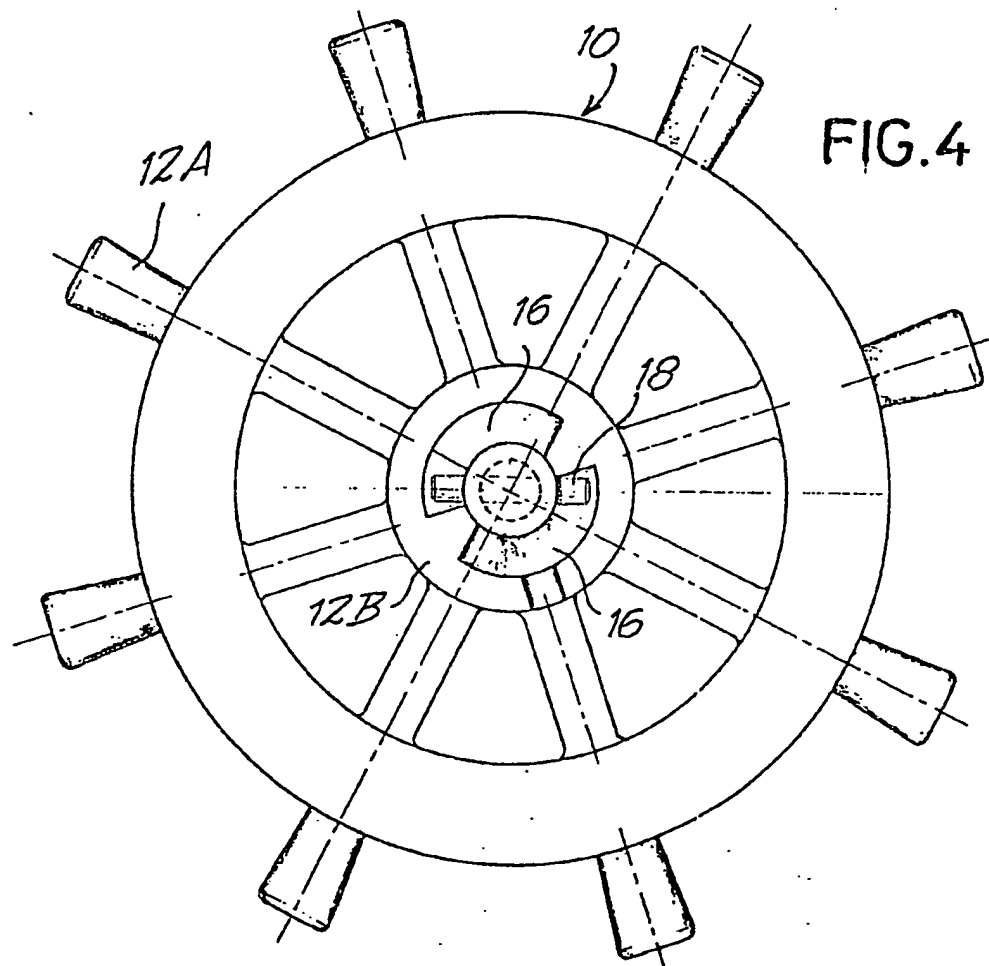


FIG. 4

## SPECIFICATION

## Suction device for attaching articles to a surface

- 5 In order to fix to a working plane - horizontal or even to a wall - small household electrical apparatuses and kitchen appliances, tools and various devices also with manual operation, sucker devices are at present used, which adhere to the working plane and are handled - for the activation of the sucker - by a manoeuvring member which is mostly developed in such a way that it is movable according to an axial plane, that is a plane including the axis of the sucker itself; therefore the room that is requested for the displacement of this manoeuvring member - generally a lever with a cam-like profile - is considerable, with a great disadvantage for the positioning and the morphology of the device to be held.

- The invention in question refers to a sucker for the above purposes, which avoids these inconveniences, and is particularly compact allowing the application, that is the fixing, of devices of any morphology which can be directly engaged to a stem type tension rod or to a peg which is part of the device itself, without requiring any particular dimensions, that are very difficult to respect, for the handling of the usual sucker application systems which are at present known.

- For the above mentioned purpose, according to the invention a sucker device is provided, which involves a cup type member with an edge suitable for acting on the periphery of the sucker and an axial central tension rod that is engaged - especially through disc type expansions or equivalent - to the sucker, which tension rod is guided axially in the cup type member and has to be forced axially in respect to the cup in order to activate the sucker; according to the invention, for the forcing manoeuvre there are provided a manoeuvring member which is angularly movable around the axis of the sucker and the tension rod thereof, and a helical coupling for the axial forcing.

- The manoeuvring member can be a disc shaped member, being possibly equipped with projections for an easy handling; however it can be also of single or double lever type.

- The helical coupling can be achieved with at least two helicoidal surfaces and with corresponding projections that cooperate with said surfaces.

- The stem of the tension rod can be crossed by a diametral pin, that forms radial projections cooperating with two opposed helicoidal surfaces, formed by the manoeuvring member.

- The drawings shown a possible form of embodiment of the invention, and in particular:

Figure 1 shows a section according to an axial plane of a sucker in the arrangement preceding the activation of the sucker itself;

Figure 2 is a view from the line II-II of Figure 1;

- Figure 3 is analogous to Figure 1, but it shows the sucker in a schematic activation arrangement, which is modified, in respect to the real arrangement, for the sake of clarity;

Figure 4 shows a view from line IV-IV of Figure 3.

- According to what is illustrated in the enclosed

- drawing, item 1 indicates the application surface, that is the working plane, which is of use for fixing the device, tool or household electrical appliance to be held in the working plane itself by means of the sucker. Item 3 indicates the cup member that has to cooperate with the sucker, being the last one indicated by numeral 5. The edge 3A of the cup member has to coact with the sucker 5 in order to assure the deformation and activation of said sucker. The sucker is engaged (in a per se known way) between two disc type expansions that are rigid and engaged in a rigid way to a tension rod type stem 9; this develops according to the axis of the cup member sucker and is guided in said cup member for an axial displacement. The cup member has an upper surface, which is plane and transversal in respect to the axis of the stem, and the manoeuvring member indicated by 10 can lean on this upper surface. This manoeuvring member 10 is movable angularly around the axis of the tension rod 9 and of the cup member 3, and said manoeuvring member 10 is developed - according to the drawing - with a disc shaped portion 12 (that in the drawing is incidentally represented as formed with spokes like a steering wheel) being advantageously equipped with external projections 12A, that are of use for helping the forcing manoeuvres described here below. Said manoeuvring member can be of a single (or double) lever type, which lever arises from the hub 12B. The member 10 centrally forms the hub 12B, that comes into contact with the upper surface of the cup member 3 and forms a passage for the tension rod 9 for a head portion 14 fitted on the end of the tension rod 9 itself. Around the passage for the tension rod 9 and for the head 14, the hub 12B forms a couple of helicoidal surfaces 16 being opposite and having a substantially radial ruling; the ends of a transversal pin 18 are suitable for reacting on these two surfaces 16 which pin crosses the tension rod 9 and the head thereof thus engaging them to each other; the head 14 projects beyond and above the hub 12B and can constitute the means of the engagement of the tool, the household electric apparatus or other to be held by the sucker.
- When starting from an arrangement as that shown in Figures 1 and 2, a rotation of the manoeuvring member 10 is caused according to the arrow f10, the ends of the pin 18 slide along the helicoidal surfaces 16 thus reaching from the area of minimum distance in respect to the cup member 3 an area of surface which is at greater distance from this cup member, then generating - because of the reaction of the hub 12B on the cup member itself - an action of returning, due to the traction or tension action of the stem 9 in respect to the cup member 3; this causes - when the sucker 5 has been laid on the working plane 1 - the formation of a vacuum in a practically virtual cavity that is indicated by V in Figure 3; in the same Figure 3 this cavity V is shown as a real cavity for explanation purposes, but it remains virtual when the sucker has been pressed against the surface 1, just before operating the manoeuvre of activation of the sucker itself and then the returning manoeuvre of the central portion of the sucker in respect to the edges that are pressed against the plane 1 by the edges 3, 3A of the

cup member 3. The operation for the sucker activation is the traditional one, but the manoeuvre thereof is actuated by a member like the member 10, that moves on a plane that is transversal in respect to the axis of the tension rod 9, rather than by a member that generally is displaced according to an axial plane and acts through a cam profile. This allows the space above the sucker group and the manoeuvring member 10 thereof to be completely free, for the application or the presentation of the household electrical apparatus, or tool or other to be engaged to the working plane. This tool, household electrical apparatus or other can be engaged to the head 14, that, for this purpose, can be configured with bayonet joint means, with screw engaging means or other suitable means, without however the need of respecting established dimensions for the manoeuvres, which need in the methods today known gives rise to a considerable difficulty.

## 20 CLAIMS

1. A sucker device for the fixing of small household electrical apparatuses and appliances, tools and various devices on a working plane, involving a cup member with an edge suitable for acting on the periphery of the sucker, an axial central tension rod engaged - especially by means of disc shaped expansions or equivalent - to the sucker, which is axially guided in the cup member and has to be forced axially in respect to the cup in order to activate the sucker, and for the forcing manoeuvre a manoeuvring member movable angularly around the axis of the sucker and the tension rod thereof, as well as a helical coupling for the axial forcing.

2. A sucker according to claim 1, wherein said manoeuvring member is a disc shaped member, possibly equipped with projections suitable for facilitating the manoeuvre.

3. A sucker device according to claim 1, wherein the helical coupling is formed by at least two helicoidal surfaces and by corresponding projections cooperating therewith.

4. A sucker according to claim 3, wherein said tension rod is crossed by a diametral pin, that forms radial projections, and wherein two opposed helicoidal surfaces are formed by the manoeuvring member in order to cooperate with said pin.

5. A sucker device for the sticking of small household electrical apparatuses and appliances and other on the working planes, with a manoeuvring member movable according to a transversal plane in respect to the axis of the sucker; all as described and represented in the drawings.